

# Fizjoterapia po rekonstrukcji ścięgna mięśnia nadgrzebieniowego – opis przypadku

*Physiotherapy After the Supraspinatus Muscle Tendon Reconstruction - Case Study*

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## Streszczenie

**Wstęp.** Uraz lub też zmiany zwyrodnieniowe związane z wiekiem są najczęstszą przyczyną utraty funkcji w obrębie struktur stożka rotatorów. Leczenie artroskopowe stożka rotatorów jest leczeniem coraz powszechniej stosowanym ze względu na potencjalne korzyści płynące z małych nacięć.

**Cel pracy.** Celem pracy jest przedstawienie efektów postępowania fizjoterapeutycznego po artroskopowym leczeniu uszkodzenia ścięgna mięśnia nadgrzebieniowego, w okresie od 5 do 16 tygodnia po zabiegu.

**Materiał i metody.** Pacjent (l. 47) z rozpoznaniem zerwania ścięgna mięśnia nadgrzebieniowego 7,5 mm. U pacjenta wykonano artroskopowe szycie m. nadgrzebieniowego przy użyciu kotwicy prawego stawu ramiennie-łopatkowego. W badaniach dokonano oceny dolegliwości bólowych skalą Laitinena, VAS, zakresu ruchomości stawu, przeprowadzono test Hawkinsa, test Neera, test Jobea, test Drop Arm oraz skalę Constant. U pacjenta stosowano rehabilitację w okresie od 6 do 16 tygodnia od zabiegu.

**Wyniki.** Po 16 tygodniach usprawniania uzyskano poprawę zakresu ruchu zgięcia, odwiedzenia, rotacji, zmniejszenie dolegliwości bólowych. Test Hawkinsa – ujemny, test Neera – ujemny, test Drop Arm – ujemny, test Jobe’a pacjent nie był w stanie odwieść ramienia do 90° wbrew oporowi, dolegliwości bólowe nie występowały. W ocenie skali Constant pacjent uzyskał 94 punkty na 100 możliwych.

**Wnioski.** Zastosowana fizjoterapia po artroskopowym leczeniu uszkodzenia stożka rotatorów w okresie od 6 do 16 tygodnia przyniosła zmniejszenia dolegliwości bólowych, poprawę zakresu ruchu, siłę mięśniową oraz poprawę funkcji w leczonym stawie barkowym.

## Słowa kluczowe:

stożek rotatorów, fizjoterapia

## Abstract

**Introduction.** Trauma or degenerative disorders associated with age are the most common cause of loss of functions within the structures of the rotator cuff. The arthroscopic treatment of the rotator cuff is a therapy applied more and more often, due to the potential benefits of very small incisions.

**Research Goal.** The aim of the study is to present the effects of physiotherapy after the arthroscopic treatment of damage to the supraspinatus tendon, within the period from 5th to 16th week after the surgery.

**Materials and Methods.** The patient (47 years old) diagnosed with the supraspinatus tendon rupture of 7.5mm, had undergone the arthroscopic suturing of the supraspinatus muscle, with the use of the right shoulder joint anchor. Within the study, there have been performed: pain assessment using the Laitinen Scale, VAS, evaluation of the joint mobility, Hawkins Test, Neer Test, Jobe Test, Drop Arm Test and the Constant Shoulder Score. The patient has been subjected to a rehabilitation treatment within the period from 6th to 16th week after the surgery.

**Results.** After 16 weeks of the rehabilitation treatment, there has been achieved the range improvement of adduction, abduction and rotation, and the decrease of pain sensation. Hawkins Test - negative; Neer Test - negative; Drop Arm Test - negative; in the Jobe Test, the patient was not able to abduct the arm against resistance to the degree of 90°, there was no pain sensation. In the assessment of the Constant Shoulder Score, the patient scored 94 out of 100 points available.

**Conclusions.** The physiotherapy, applied within the period from 6th to 16th week after the arthroscopic treatment of the rotator cuff damage, has caused the reduction of pain sensation, improved mobility range, muscle strength and better functioning of the treated shoulder joint.

## Key words:

rotator cuff, physiotherapy

### Introduction

The shoulder is being described as one of the most mobile joints, while at the same time it has reduced bone stability [1], with the complex structure of static and dynamic stabilizers. The objective of the shoulder joint function is the ability to carry heavy loads on one hand, and to ensure precision movements on the other, and the tasks are reflected in the structure of rotator cuff. The rotator cuff is composed of short muscles rotating the arm, which are woven into the joint capsule and keep the head of humerus within the joint cavity of the scapula, allowing for the correct orientation of the joint, both, during movement and at rest [2, 3]. Trauma or degenerative disorders associated with age are the most common cause of loss of functions within the structures of the rotator cuff: approximately 54% of adults over the age of sixty show either partial or complete loss of the rotator cuff function, while it is only 4% within the population from 40 to 60 years old [4]. The arthroscopic rotator cuff treatment is a surgical procedure, used increasingly more often due to the minimally invasive surgical approach, less trauma to the deltoid, possibility of correction of the coexisting disorders, easier acceptance by the patient and lower level of the post-operative pain. Although the arthroscopic rotator cuff repair seems to be relatively minor surgery, the postoperative rehabilitation is a long process, crucial for the long term improvement of the repaired tissue, which, among others, affects the healing time of the surgically treated soft tissue [4].

### Research Goal

The aim of the study is to present the effects of physiotherapy after the arthroscopic treatment of damage to the supraspinatus tendon, within the period from 5th to 16th week after the surgery.

### Materials and Methods

The patient (47 years old) has been diagnosed with the torsion injury of the shoulder. In the MRI examination of the right shoulder, there have been found: crack gap in the vitreous of the articular labrum located in the anterolateral area of the articular fossa, broken long head of the biceps brachii, broken supraspinatus muscle tendon for 7.5mm, proximally in relation to the greater tubercle of the humeral head, with the regressive changes of the supraspinatus belly rated 3 on the scale of 4. The patient had undergone the arthroscopic suturing of the supraspinatus muscle, with the use of the right shoulder joint anchor. Within the study, there have been performed: pain assessment using the Laitinen Scale, VAS, evaluation of the joint mobility and its general functioning before the therapy and after 16 weeks of rehabilitation. After 16 weeks of treatment there have been also performed: Hawkins Test, Neer Test, Jobe Test, Drop Arm Test and the Constant Shoulder Score.

In the physiotherapy, there have been applied:

Weeks 6 – 8: PNF patterns for scapula and upper extremity, myofascial release of the shoulder girdle, back, pectoral muscles, Mulligan mobilization, exercises: centralization of the humeral head, strengthening the muscles: biceps brachii, triceps brachii, rotators using kinesio taping, pendulum Codman exercises, and the general fitness physiotherapy

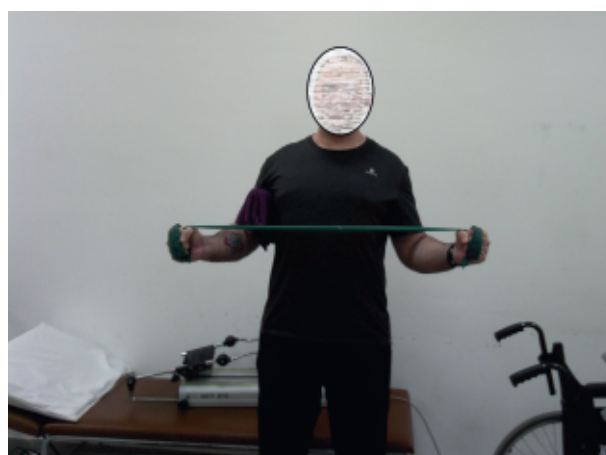
procedures: low-frequency magnetic field, cryotherapy of the shoulder joint.

Weeks 9 – 12: PNF patterns for scapula and upper extremity, proprioception exercises, myofascial release of the superior fibers of the trapezius, levator scapulae, pectoralis muscles, Mulligan mobilization, exercises: centralization of the humeral head, strengthening the muscles: biceps brachii, triceps brachii, rotators using kinesio taping, with the external resistance lying on the side, lying on the belly; active exercises of the treated upper extremity in the kinematic chains of the back lower extremity (performed symmetrically for the both upper extremities); pendulum Codman exercises, and the general fitness physiotherapy procedures: low-frequency magnetic field, electro stimulation of the deltoid.

Weeks 12 – 16: PNF patterns for upper extremity, Mulligan mobilization, proprioception exercises, strengthening the shoulder girdle muscles adduction and abduction movements, strengthening the biceps brachii, triceps brachii, rotary muscles, centralization of the humeral head exercises, exercises in push up position, return to the recreational sport activities: swimming, bicycle riding, physiotherapy procedures: iontophoresis with potassium iodide, ultrasounds, laser.



**Fig. 1. Exercises strengthening muscles of the shoulder girdle**



**Fig. 2. Exercises strengthening rotator muscles, with the use of kinesio taping**



**Fig. 3, 4. Exercises to increase range of motion in the shoulder joint**





**Fig. 5, 6. Mulligan mobilization, technique of mobilization with movement ('MWM'), using a belt for the adduction movement in the shoulder joint**

### Results

Results are presented in Table 1, Fig. 7, Fig. 8, Fig. 9, Fig. 10. Hawkins Test - negative; Neer Test - negative; Drop Arm Test - negative; in the Jobe Test, the patient was not able to abduct the arm to the degree of 90° and maintain the position against resistance, there was no pain sensation. In the assessment of the Constant Shoulder Score, the patient scored 94 out of 100 points available.

**Table 1. Results of evaluation of range of motion, pain scale VAS, Laitinen**

	Plane	Range of motion before rehabilitation	Range of motion after 8 weeks of rehabilitation	Range of motion after 16 weeks of rehabilitation
Shoulder	S 50-0-170	20-0-40	40-0-80	40-0-160
	F 170-0-0	70-0-0	80-0-0	140-0-0
	R (F90) 90-0-80	-	-	70-0-70
	R (F0) 60-0-70	10-0-60	20-0-70	50-0-70
	pain scale			
	Laitinen Scale	10/16	6/16	4/16
	VAS Scale	6/10	3/10	2/10 – day 4/10 – night



Fig. 7. Adduction movement range in the shoulder joint

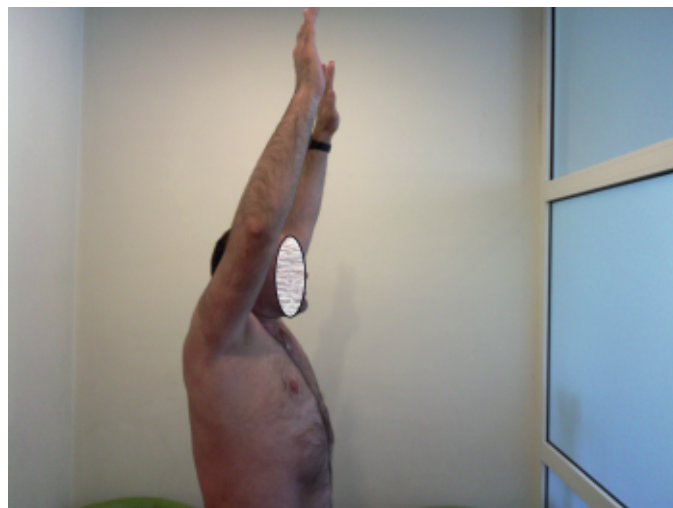


Fig. 8. Raising movement up front in the shoulder joint



Fig. 9. Abduction movement range in the shoulder joint

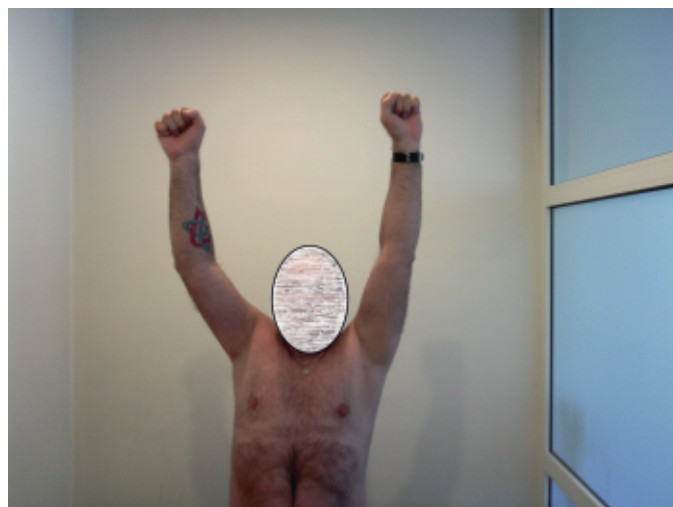


Fig. 10. Raising movement up side in the shoulder joint

### Discussion

In the subject literature, we can find many reports on both, the time of rehabilitation introduction and its different methods applied after the arthroscopic treatment of the rotator cuff damage. Yi et al. [5] in their study have made an attempt to determine the impact of different rehabilitation protocols on the results of the clinical trials, comparing the early and the later introduced mobilization techniques and continuous passive motion (CPM) to the manual therapy after the arthroscopic rotator cuff repair. As the authors point out, the current data do not define a significant difference between the rehabilitation protocols, which stress the various times of mobilizing the patient, application of the manual therapy and using the CPM. Lee et al. [6] have made a comparison between the application of the aggressive early rehabilitation: manual therapy 2 times a day plus passive exercises (stretching exercises), and the limited early rehabilitation: continuous passive movement and self-administered exercises. Their study covered the period from 6 to 12 months after the surgery. The pain, range of motion, muscles endurance and the overall functionality have been greatly improved after the arthroscopic treatment of the rotatory cuff, regardless of the methods and the time of the postoperative rehabilitation protocols

introduction. However, the authors note, that the too early and excessively aggressive rehabilitation at the beginning of the mobilization process, may increase the possibility of the anatomical damage within the structure being repaired. Other authors [7], based on their observations, recommend from day one after the surgery, application of a passive range of motion exercises, including the movement of flexion, internal and external rotation twice a day; (beginning from the 6th week after the treatment) an active range of movement and strengthening exercises, which should be introduced gradually, which in consequence provides basis for the quick return to the regular, everyday activities. According to Ross et al. [8] there are two schools regarding the level of activity after the arthroscopic treatment of the rotator cuff, within the period from 4th to 6th week. Some authors recommend the early, more aggressive rehabilitation program, along with the use of the continuous passive motion; others propose later, more conservative methods of rehabilitation [9]. Apart from the surgical procedure, the main factor contributing to the positive results in the rotator cuff repair is the postoperative treatment of the patient. The rehabilitation protocols must take into account the degree of damage to the rotator cuff and the healing process of the tendon [10, 11]. A good rehabilitation program should be selected in such way, as to allow best possible healing of the repaired tendon, while preventing the stiffness of the shoulder. Since each patient and each type of the rotator cuff damage would not be the same, therefore the rehabilitation therapy must take into account all those differences, in order to achieve the optimum treatment results.

### Conclusions

The physiotherapy, applied within the period from 6th to 16th week after the arthroscopic treatment of the rotator cuff damage, has caused the reduction of pain sensation, improved mobility range, muscle strength and better functioning of the the treated shoulder joint.

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